

BUILDING STRENGTH FROM COMPROMISE; A CASE STUDY OF FIVE YEAR COLLABORATION BETWEEN THE STATISTICAL SERVICES CENTRE OF THE UNIVERSITY OF READING, UK AND MASENO UNIVERSITY, KENYA

James Musyoka¹, David Stern^{1,2} and Roger Stern³
¹Maseno University, Kenya

²African Institute of Mathematical Sciences – Next Einstein Initiative, Maseno University, Kenya

³Statistical Services Center, University of Reading, UK

jkmusyoka@maseno.ac.ke

Statistics teaching and practice at Maseno University has benefited immensely from its collaboration with the Statistical Services Centre (SSC) at the University of Reading. The SSC, a self-sustaining entity providing statistical consultancy to a wide range of clients in Africa, has also found a trusted pair of hands to help with its work in the developing world. The success of this collaboration is due to the long-standing working relationship between staff at these two institutions which this paper describes from both points' of view. This collaboration is not without challenges and this paper also discusses the compromises made by both parties to make this collaboration work.

INTRODUCTION

For statistics at Reading University, a similar long term collaboration is described by (Wilson, Abeyasekera, Stern & Samaranyake, 1985), with equivalent aims. The summary to that paper included “A case study is presented of more than 10 years’ cooperation designed to help establish a Statistical Unit with applied interests in a Sri Lanka university. The link approach is described and contrasted with other forms of technical assistance. The progress achieved in Colombo and the benefits to Reading are outlined.” The collaboration described here is considerably younger, but has also been of considerable benefit to both parties.

Maseno University is the seventh public university to be established in Kenya. It hosts the School of Mathematics, Applied Statistics and Actuarial Science among others. The school is divided into two departments, one of which is the department of Statistics & Actuarial Science which offers both undergraduate and postgraduate degrees in applied Statistics among others, (Stern, Ongati, Agure, & Ogame, 2010). Over the past five years, the department has been involved in a number of initiatives aimed at transforming the teaching of statistics courses to reflect the ever-changing market demands of statistics practice. One recent example of such initiatives is the new eLearning MSc. degree in Research Methods which was designed to help its participants acquire a general set of skills needed to effectively support research, (Stern, Coe, Stern, & McDermott, 2013). The success of these initiatives is partly due to the existing collaboration between the University and the SSC (Statistical Services Center) of the University of Reading who, from time to time, have supported these initiatives.

The SSC is a non-academic, self-financing entity of the University of Reading. It provides consultancy and training in Applied Statistics, (SSC, University of Reading, 2010). The center is involved in supporting and backstopping research and development work in Africa. This support demands an all-round set of skills from the design stages of studies/experiments through to dissemination. From experience, they have found that overall quality of research is improved if high levels of quality are maintained at each stage of the research process. A ‘Data Flow’ concept (<http://www.reading.ac.uk/ssc/resources/>) was developed from this experience. The idea of ‘research methods’ was also coined to refer to the general set of skills needed to support research. Their success has attracted more and more work which has led to the need and demand to develop local capacity to help with this ever-increasing load. Maseno University has been one of the local partners in an arrangement that has benefited both parties in many ways.

This paper illustrates the benefits, challenges and compromises made by both parties to make this collaboration a success. We also draw lessons from this experience to stimulate and encourage similar collaborations.

AREAS OF COLLABORATION

The collaboration began with Maseno staff taking SSC short e-learning courses and these are described first. At the same time the Maseno MSc in Applied statistics was being changed to make it more applied and resources developed by the SSC were instrumental in these changes. This was given further impetus with a visit by a junior staff member from the SSC to Maseno, which has expanded into a series of visits in both directions. The collaboration has since expanded to include collaborations on research projects.

Short eLearning Courses

In 2009 four junior staff members and students at Maseno took an e-learning course offered by the SSC, called “Statistics Made Simple” (Dale, Clark, Stern, Leidi, & Stern, 2010), abbreviated as eSMS. This course was constructed at Reading for non-statisticians who were starting their research and had yet to master the key basic statistical concepts, e.g. standard errors, p-values, significance tests, statistical models. The four from Maseno were all statisticians who were completing, or had completed, their MSc. They found eSMS to be very useful, partly because their own training had emphasized formulae, rather than concepts. They recommended that the course would be even more useful at the start of an MSc in applied Statistics at Maseno and a small second group of students later got the opportunity to take the course. SSC adopted this idea in their support of a RUFORUM MSc in Research Methods at JKUAT (Jomo Kenyatta University of Agriculture and Technology) in Kenya, (Stern, Coe, Stern, & McDermott, 2013). This was highly appreciated by the 30 students on that program who still mention it years later as an important part of their experience.

Following the strong positive reviews of eSMS by Kenyan students, the SSC entered into a partnership agreement with Maseno University to give the course in Kenya. For this run, Maseno University was fully responsible for the delivery of the course while the SSC were only involved in monitoring and backstopping. This arrangement meant that the course could be run much more cheaply than if the SSC staff were to run the course. The high number of course applicants received once the course was advertised was a clear indication that the new fees were affordable. This meant that SSC could use such an arrangement to run short courses which are on high demand. Out of the 70 or so participants in the course, around 40 were able to fully complete the course and Maseno held a small graduation ceremony for them. Following this experience the Maseno Authorities understood the potential for eLearning and this assisted in their launching full eLearning degree programs 6 months later.

eSIAC (Statistics In Applied Climatology) is another online course offered by SSC. Following the initial relationship with eSMS a number of Maseno MSc students took this course as a precursor to starting climate related MSc projects. Maseno University staff have since been involved in giving three separate runs of eSIAC and have also assisted in follow-up face to face workshops. The most recent run of eSIAC was an order of magnitude larger than anything SSC had attempted before, with just over 200 participants from all over Africa. SSC had reworked the SIAC course so most of the previous manually marked tasks were now automated and a Maseno University staff member facilitated the whole group.

Electronic Resources

The SADC (Southern Africa Development Community) training pack (SSC, University of Reading, 2007) was prepared by the SSC with support from the European Union as initial training for statistical officers in the National Statistical Services for Southern Africa countries. It is also usable more generally, (SSC University of Reading, 2007). Materials from this pack have been used by the Maseno statisticians in their transformation of the teaching of computing and statistics to undergraduates, (Stern, Ongati, Agure, & Oganje, 2010). From this experience, Maseno found that some of the resources and materials are not easy to use in the teaching and learning of statistics as was expected. This resource has not been used as widely as hoped and the Maseno feedback is the only communication SSC has had from its use.

CAST (Computer Assisted Statistics Textbook) is another resource that SSC helped to adapt for Africa (Kurji, McDermott, Stern, & Stern, 2010) and has been used extensively in statistics teaching at Maseno. CAST is a series of interactive electronic textbooks and, partly

through SSC, Maseno was at the forefront of using the book of exercises and testing systems when they were added, (Stern, Stirling & Stern 2009) (Stern, Stirling, Dale & Stern, 2010). Maseno MSc students were the first group, outside the originator in New Zealand, to use the full trilogy and a Maseno student, with joint MSc supervision by Maseno and the SSC, then used CAST (including the exercises and tests) very successfully for teaching his business diploma students at Kenya Institute of Management (KIM), (Manyalla, 2012) (Manyalla, Mbasu, Stern & Stern 2014). These results have contributed to SSC integrating the latest version of the CAST trilogy into their e-learning courses from 2014.

The SSC were contracted by RUFORUM to support the MSc Research Methods at JKUAT mentioned above. Maseno staff were also involved in the support through SSC as well as developing and giving a climatic course based on materials developed by the SSC. The JKUAT programme faced a variety of challenges particularly when the funding ended. Based on SSC ideas, Maseno University designed its own MSc Research Methods programme to respond to the ever-increasing demand for these skills (Stern, Coe, Stern, & McDermott, 2013). The Maseno program also faced its own challenges leading to its transformation back to a traditional statistics MSc. The way this happened placed a strain on the SSC Maseno collaboration. The resources from this MSc have undergone a number of iterations, first as support resources for JKUAT, then full eLearning courses at Maseno and now back to the SSC where they are being developed further, for use as short courses. There are also new potential partners in Kenya as the need for this degree has not gone away.

Staff Visits between the Institutions Including Junior Staff

In 2010 the SSC provided a young statistician, who had just joined at Reading, to give one of the MSc courses at Maseno, with support from a senior staff member from Maseno. This initiative was a success for all parties. For the SSC, this experience gave confidence and experience to their young statistician. For Maseno, it provided an applied teaching style and also introduced some “statistical games” into the teaching. The course materials which comprised lecture notes, practical instructions and datasets remained in Maseno and were used again in future years, (Musyoka, Otieno, & Stern, 2010).

Other visits between staff of the two institutions have also been organized as part of this collaboration. These visits have always given staff of both institutions an opportunity to interact, work together and most importantly led to the personal relationships that have sustained the collaboration. These visits also create a process of interaction which enhances the working relationship between the two institutions by gaining insights into the administrative procedures and limiting the misunderstandings about the partner’s situation. These visits have provided Maseno staff with time away from their normal busy work schedule which enables a focused period of study. This study time has been used to deepen statistical understanding, work on collaborative projects and make progress on PhD research.

Partnering in Research

Since 2010 the SSC has been providing research support for a series of agricultural research projects funded by the McKnight foundation under their CCRP (Collaborative Crops Research Programme, <http://ccrp.org/>). The support covers the “data flow” concept which comprises support on the design of the research studies, on the collection and then organization of the data, on the analysis and then on the reporting. The foundation was keen for local statisticians to be involved in providing the support as soon as they have the necessary skills. Two staff members from Maseno began to be involved in the project and were able to acquire the skills to support work on data organization in projects in both Uganda and Kenya. For Maseno this provided funding to employ a top MSc student in the department, who has now become a full time staff member. For SSC, this meant that some of the data issues and problems can be sorted out more quickly and easily because the support is provided from a local institution. The fact that work continued beyond the original agreement, without additional financial support, is a testament to the value both parties place on the collaboration.

There has also been extensive collaboration between Maseno and SSC staff on research projects. This has included joint supervision of more than half a dozen Maseno MSc research

projects, with more ongoing including a PhD thesis. There have also been a number of joint grants where Maseno has been a local partner funded through SSC. One such project funded through the Rockefeller foundation has had mixed success. Most of the activities went well but Maseno had a couple of issues fulfilling their role. The funds to employ a new staff member, as before, were included in the contract but this was no longer possible due to changes in the Maseno administration. There was also a task which was given to a junior member of the Maseno team which proved to be beyond his capabilities. This need not have been an issue but he did not ask for help constructively when it was clearly needed and hence the job could not be completed.

Recently there have been a number of collaborative contracts relating to CCAFS (Climate Change Agriculture and Food Security, <http://ccafs.cgiar.org/>). The SSC CCAFS grant is again one which Maseno staff contributes to, this time with the funds provided through a local NGO. Maseno also has its own independent CCAFS grant running through the University which builds from the SSC work and expertise.

COMPROMISES

Most of the success of this collaboration between Maseno and SSC would not have been possible without compromises from both parties. Both financial and time sacrifices had to be made by individuals to ensure that the activities were successful, but more significantly each has had to understand and deal with the administrative difficulties of the other institution.

The duties of staff of Maseno University involve post graduate studies, administrative roles within the department, teaching lecture courses (normally a minimum of three a semester), examining and supervising students. They took on the tasks and responsibilities that came with this collaboration over and above their normal job descriptions. The involvement in the collaborative projects was deemed to be worth the additional tasks, because it provides useful lessons and insights which have helped in their personal development. It has been difficult to interest more established lecturers partly because there are many other opportunities to make extra money, which they value over the vague possibility of personal development.

Financial sacrifices have also been made to facilitate Maseno University staff to undertake work in different projects. The Maseno administrative system made it difficult to manage money for local expenses in a timely way. SSC's administrative structures dictate that funds are provided to reimburse expenses and so there was a need to create a working capital which would be maintained whenever expenses were claimed. This often led to a difficult situation where there could have been funds available to support Maseno staff involvement but due to the difficult constraints from both partners it was not possible to offer them that support. A senior member of staff at Maseno University provided the funds for this working capital. Without this buffer the junior staff would not have been able to be involved as the working capital represents substantially more than a month's salary and they are generally living from paycheck to paycheck.

Recently some of the Maseno staff have been involved in launching a Kenyan NGO (Non-Governmental Organisation) called AMI (African Maths Initiative) with the intention of scaling out some of their initiatives beyond Maseno University. This has provided another avenue for collaboration which allows for the management of much smaller projects as well as a broader range of interactions. AMI already provides additional resource people who extend the scope of the collaboration, including the range of tasks that can be taken on.

CONCLUSIONS

We hope the description provided here will tempt more people to engage in similar long term ventures, while accepting that there will be difficulties coming from the differences in circumstance of the partners. The collaboration started through individual staff who enjoyed working together, rather than through an institutional arrangement, and this remains the key. Institutional involvement is needed ideally to provide an enabling environment but at least to allow progress.

The collaboration is taking place at a time when the work of the SSC in Africa is expanding, making it therefore ever more attractive and important to work with local partners. The partnership with Maseno has contributed to this expansion by demonstrating SSC's capability of collaborating with local institutions. Many project proposals are strengthened if they include a

capacity building component which works towards empowering local partners with the skills needed to make the impacts sustainable.

This paper has stressed the use of the SSC resources by Maseno University. Some of these resources are already Open Educational Resources (<http://www.oercommons.org/>) and others are being added, including the components of the e-learning courses. The collaboration has contributed to the SSC's plans to move more towards open educational content for their resources. This provides good incentives for the Maseno team to embrace this sharing philosophy, which leads to the possibility of incremental improvement of resources for the partners, but also more widely.

The staff involved at Maseno have developed professionally to the point where they can contribute in international research projects, while increasing their awareness of where further development is needed. The fact that the last few years have made it easier for students and staff to take advantage of modern technology has facilitated the use of the SSC resources to enhance teaching and learning. The plan is for some of the graduates who have experienced these improved learning methods be integrated into the collaboration.

This collaboration has already contributed to the University of Reading's Pro-Vice Chancellor of Internationalisation visiting Maseno University to investigate the potential for institutional linkages. This visit reinforced the importance of individual partnerships at the heart of institutional arrangements.

This paper shows that these long term partnerships can be valuable, but are essentially centered around the individuals who contribute to them. Finding compatible people who have the enthusiasm and time to broaden this collaboration is a challenge. With the expansion of SSC work and growth of the potential collaborators we hope to be able to rise to the challenge.

REFERENCES

- Dale, I., Clark, C., Stern, R., Leidi, S., & Stern, D. (2010). E-learning of statistics in Africa. In C. Reading (Ed.), *Proceedings of Eighth International Conference on Teaching Statistics*. Voorburg, the Netherlands: ISI.
- Kurji, P., McDermott, B., Stern, D., & Stern, R. (2010). The growing role of computers for teaching statistics in Kenya. In C. Reading (Ed.), *Proceedings of Eighth International Conference on Teaching Statistics*. Voorburg, the Netherlands: ISI.
- Manyalla, B. (2012). *The use of Computer Based Tests (CAST tests) and CAST exercises to improve the learning of statistics at tertiary level of education*. MSc Thesis. Maseno, Kenya: Maseno University.
- Manyalla, B., Mbasu, Z., Stern, D., & Stern, R. (2014). *Measuring the effectiveness of using computer assisted statistics textbooks in Kenya*. Paper presented at the Ninth International Conference on Teaching Statistics, Flagstaff AZ, USA.
- Musyoka, J., Otieno, J., & Stern, D. (2010). Training of lecturers at Maseno University, Kenya. In C. Reading (Ed.), *Proceedings of Eighth International Conference on Teaching Statistics*. Voorburg, the Netherlands: ISI.
- SSC University of Reading (2007, September). *SADC Resource DVD*. Retrieved February 16, 2014, from SSC University of Reading: <http://www.reading.ac.uk/ssc/n/SADC%20DVD/index.html>
- Stern, D., Ongati, O., Agure, J., & Ogange, B. (2010). Incremental modernisation of statistics teaching and curriculum at Maseno University, Kenya. In C. Reading (Ed.), *Proceedings of Eighth International Conference on Teaching Statistics*. Voorburg, the Netherlands: ISI.
- Stern, D., Stirling, D., & Stern, R. (2009). Improving the learning of statistics with computer based exercises. *IBS SUSAN Conference Proceedings*.
- Stern, D., Stirling, D., Dale, I., & Stern, R. (2010). The use of computer-based tests to consolidate statistical concepts in Kenya. In C. Reading (Ed.), *Proceedings of Eighth International Conference on Teaching Statistics*. Voorburg, the Netherlands: ISI.
- Stern, R., Coe, R., Stern, D., & McDermott, B. (2013). MSc training in research methods support. *Technology Innovations in Statistics Education*, 7(2).
- Wilson, I. M., Abeyasekera, S., Stern, R. D., & Samaranyake, V. K. (1985). Stimulating statistical progress in a developing country by a link between universities. *Biometrics*, 41(3), 599-607.